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(54) Title: 18221, DUAL SPECIFICITY PHOSPHATASE AND USES THEREOF

(57) Abstract: The invention provides isolated nucleic acids molecules, designated 18221 nucleic acid molecules, which encode novel dual specificity phosphatase family members. The invention also provides antisense nucleic acid molecules, recombinant expression vectors containing 18221 nucleic acid molecules, host cells into which the expression vectors have been introduced, and nonhuman transgenic animals in which a 18221 gene has been introduced or disrupted. The invention still further provides isolated 18221 proteins, fusion proteins, antigenic peptides and anti-18221 antibodies. Diagnostic methods utilizing compositions of the invention are also provided. The invention also provides methods of modulating the differentiation and proliferation of hematopoietic cells (e.g., erythroid cells) utilizing the compositions of the invention. Accordingly, methods of treating, preventing and/or diagnosing hematopoietic disorders are disclosed.

# INTERNATIONAL SEARCH REPORT

International Application No.

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/55 C12N9/16 C12N5/10 C07K16/40 G01N33/68  
C12Q1/68 C12Q1/42 A61K39/395 A61K31/7088

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C12Q A61K G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBL, SEQUENCE SEARCH, BIOSIS, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL 'Online! accession number AI025365, 19 June 1998 (1998-06-19) NCI-CGAP: "ow27b10.s1 Soares_parathyroid_tumor_NbHPA Homo sapiens cDNA clone IMAGE:1648027 3' similar to SW:DUS5_human Q16690 Dual Specificity Protein Phosphatase 5; , mRNA sequence" XP002144714 abstract</p> <p style="text-align: center;">--- -/--</p>	1-3,5,12

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

27 November 2001

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17/12/2001

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## INTERNATIONAL SEARCH REPORT

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## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE EMBL 'Online! accession number AI031656, 24 June 1998 (1998-06-24) NCI-CGAP: "ow48e06.x1 Soares_parathyroid_tumor_NbHPA omo sapiens clone IMAGE:1650082 3' similar to SW:PTP3_CHLEU Q39491 putative protein tyrosine phosphatase;; mRNA sequence " XP002144713 abstract	1-3,5,12
X	--- DATABASE EMBL 'Online! accession number AI394036, 5 March 1999 (1999-03-05) NCI-CGAP: "tg1109.x1 NCI_CGAP_CLL1 Homo sapiens cDNA clone IMAGE:2108512 3' similar to SW:DUS5_human Q16690 DUAL SPECIFICITY PHOSPHATASE 5; mRNA sequence" XP002183861 abstract	1-3,5,12
X	--- DATABASE EMBL 'Online! MM1134372, accession number AA216840, 10 February 1997 (1997-02-10) M. MARRA ET AL: "The WashU-HHMI Mouse EST project: mu88e05.r1 Soares mouse lymph node NbMLN Mus musculus cDNA clone IMAGE:652640 5' similar to TR:G992594 Tyrosine phosphate.;; mRNA sequence" XP002183862 abstract	1
A	--- MUDA MARCO ET AL: "Molecular cloning and functional characterization of a novel mitogen-activated protein kinase phosphatase, MKP-4" JOURNAL OF BIOLOGICAL CHEMISTRY, THE AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS, INC., US, vol. 272, no. 8, 1997, pages 5141-5151, XP002144712 ISSN: 0021-9258 the whole document	1-10,12
A	--- WO 97 06245 A (MEDICAL RES COUNCIL ;DAVIES KAY ELIZABETH (GB); THEODOSIOU ASPASIA) 20 February 1997 (1997-02-20) the whole document --- -/--	1-20, 22-37

# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 01/09603

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KEYSE S M: "AN EMERGING FAMILY OF DUAL SPECIFICITY MAP KINASE PHOSPHATASES" BIOCHIMICA ET BIOPHYSICA ACTA. MOLECULAR CELL RESEARCH, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 1265, 1995, pages 152-160, XP000196716 ISSN: 0167-4889 ----	
A	WO 99 02704 A (MYERS MICHAEL P ;COLD SPRING HARBOR LAB (US); TONKS NICHOLAS K (US) 21 January 1999 (1999-01-21) the whole document ----	1-20, 22-37
P,X	WO 01 12819 A (PLOWMAN GREGORY D ;LIOUBIN MARIO (US); SUGEN INC (US); WHYTE DAVID) 22 February 2001 (2001-02-22) the whole document especially sequences ID no.27 and 28 ----	1-20, 22-37
P,X	WO 00 60099 A (CEPTYR INC ;LUCHE RALF M (US); WEI BO (US)) 12 October 2000 (2000-10-12) the whole document especially fig.1 and 2 claims; examples -----	1-20, 22-37

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## Continuation of Box I.1

Although claims 24-35 (as far as they concern an in vivo method ) are directed to a method of treatment of the human/animal body (rule 39.1 IV PCT), the search has been carried out and based on the alleged effects of the compound/composition.

Although claims 36-37 are directed to a diagnostic method practised on the human/animal body (rule 39.1 IV PCT), the search has been carried out and based on the alleged effects of the compound/composition.

## Continuation of Box I.2

Claims Nos.: 21 completely and 15, 18, 24-31 partially

Claims 21 refers to a method for modulating the activity of a polypeptide using a compound which binds to said polypeptide without giving a true technical characterization. Moreover, no such compounds are defined in the application. In consequence, the scope of said claim is ambiguous and vague, and its subject-matter is not sufficiently disclosed and supported.

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the results to be achieved.

Claims 24-28, 31 refer to a method for modulating hematopoiesis using an agent that modulates the activity or expression of a polypeptide and claims 29-30 refer to a method of modulating hematopoiesis using an agent that modulates the activity or expression of a nucleic acid without giving a true technical characterization. Moreover, no such compounds are defined in the application.

In consequence, the scope of said claims is ambiguous and vague, and their subject-matter is not sufficiently disclosed and supported.

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the results to be achieved. But a partial search has been carried out as far as the agent is an antibody as defined in claim 28 (for claims 24-28, 31) or an antisense as defined in claim 30 (for claims 29-30).

Claim 15 refers to a kit comprising a compound which selectively binds to a polypeptide without giving a true technical characterization. Moreover, no such compounds are defined in the application. In consequence, the scope of said claim is ambiguous and vague, and its subject-matter is not sufficiently disclosed and supported.

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the results to be achieved. But a partial search has been carried out as far as the compound is an antibody as mentioned in claim 14.

Claim 18 refers to a kit comprising a compound which selectively hybridizes to a nucleic acid molecule without giving a true technical characterization. Moreover, no such compounds are defined in the application. In consequence, the scope of said claim is ambiguous and vague, and its subject-matter is not sufficiently disclosed and supported.

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the results to be achieved. But a partial search has been carried out as far as the compound is a probe as mentioned in claim 17.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/09603

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 9706245	A	20-02-1997	AU WO	6664996 A 9706245 A1	05-03-1997 20-02-1997
WO 9902704	A	21-01-1999	AU WO	8479498 A 9902704 A2	08-02-1999 21-01-1999
WO 0112819	A	22-02-2001	AU WO	6903800 A 0112819 A2	13-03-2001 22-02-2001
WO 0060099	A	12-10-2000	AU WO	4213100 A 0060099 A1	23-10-2000 12-10-2000